

Obesity and the Functional Impairment of Older Women

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Abstract

Background: Obesity has become a leading global public health problem and termed as millennium disease with worldwide spread. Obesity may be a modifiable risk factor for older adult impairment which needs to be completely addressed. Aimed to: assess obesity and the functional impairment of older women. **Design:** Case control design was used. **Setting:** The present study was done at Kafar Mosa Amran, Zagazig District, Sharkia Governorate. Subjects and methods: 150 older women were selected for the study (75 older women case, 75 older women control) by multistage cluster sampling technique. **Tools of data collection:** Three categories of tools: the first tool for measuring socio-demographic data, BMI, health characteristics of older women, practicing exercises and perception of physical fitness, the second tool was functional impairment questionnaire; the third tool was Lawton instrumental activities of daily livings to assess dependency of older women. **Results:** 98.7% of study group compare to 64.0% in the control group were impaired and unable to function with statistically significance ($X^2=29.68$ and $P<0.001$). 13.5% of the study groups were independent in activities of daily living compared to 42.7% in the control group. Additionally, the study revealed that age and BMI were risk factors for functional impairment. **Conclusions:** Obesity in women aged 65 or older is associated with greater risk of impaired physical function with greater dependency level on others. **Recommendation:** Health education campaigns appear to be the most effective interventions to increase awareness of older women concerning obesity related health risks. Experimental study is suggested to manage obesity burden, and the study can also be replicated in urban areas or on larger samples.

Keywords: Obesity, functional impairment, older women.

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INTRODUCTION

Aging is a complex process that affects most of living organisms. In humans from the moment of conception until death occur a series of changes in processes and physiological factors with the acquisition of new skills and loss or maintenance of others which determines the resulting aging of the whole organism. More over, Aging brings double the risk of comorbidity and disability and the fragility of the elderly is characterized by psycho-social failure that comes with it. One of the important points in the analysis of an aging population it is the disability and loss of functional ability, which unfortunately often characterized the last years- life [1].

In 2050 Egypt is expected to have the largest number of old (23.7 million) and oldest old (3.1 million) populations in the region. The Egyptian census is carried out every 10 years; the last one was in 2006. The percent of older people “defined as 60 years of age

and more” was 4.4% in 1976, 5.75% in 1996 rising to 6.27% in 2006. The percentage is projected to be 6.9% in 2015, 9.2% in 2021 and it is expected to reach 20.8% in 2050. This means that around 20 million Egyptians will be elderly by time [2].

Obesity is defined in terms of body mass index (BMI). The World Health Organization (WHO)-endorsed international classification defines obesity in three grades: BMI 25 to 29.9 kg/m² Grade 1 obesity (moderate overweight); BMI 30 to 39.9 kg/m² Grade 2 obesity (severe overweight); and BMI 40 kg/m² Grade 3 obesity (massive/morbid obesity). Thus, overweight is usually defined in terms of a BMI of 25 or more and obesity in terms of a BMI of 30 kg/m² or more. Underweight is usually defined as a BMI of less than 18.5 kg/m² [3].

Obesity is a multifactorial disease caused by a chronic energy imbalance in which energy intake

exceeds energy expenditure, leading to the accumulation of excess adipose tissue. Regulation of energy homeostasis is a complex process, that fact-have a considerable challenge in trying to clarify the pathogenesis of obesity [4].

Obesity is a considered a serious threat to public health. Health risks of obesity are largely mediated through disruptions to metabolism, which emerge in response to excess fat and which may subsequently lead to type 2 diabetes, cardiovascular diseases and premature mortality. One of the greatest and most enduring -sources of pain, disability and diminished quality of life at older ages. Obesity with or without metabolic dysfunction may be hypothesized to limit functional ability to a similar degree [5].

Functional dependence is the inability to maintain the physical and mental skills necessary to live independently and autonomously. It is generally measured by the inability to perform the activities of daily living (ADLs), either basic activities (BADLs), which are often described as self-care activities, or instrumental activities (IADLs), which involve the organization of one's daily routine [6].

Functional impairment may be acute, occurring within a week, or sub-acute, developing over many weeks or months. It is associated with social isolation, reduced quality of life, and death. It is also an important predictor of hospitalization, prolonged hospital stay, repeat emergency department visits and need for home care. It has also been reported that identification of functional decline in elderly patients is more predictive of mortality than organ damage or severity of illness. With the geriatric population placing an ever-increasing burden on health care [7].

Significance

Obesity plays a significant role in causing poor health in women, negatively affecting quality of life and shortening quantity of life. There are many obesity-related conditions, which mostly affect women. These include: osteoarthritis, breast and endometrial cancers, cardiovascular and functional impairment. Older Women who are overweight or obese are at a higher risk of developing these conditions compared to those who are not [8].

AIM OF THE STUDY

The current study aimed to assess obesity and the functional impairment of older women. This aim was fulfilled through the following objectives to:

- Identify the functional impairment of older women in the study and control group.
- Assess dependency of older women in the study and control group.
- Determine the relationship between obesity and functional impairment of older women

Research Questions

- What are the functional impairment older women?
- What is the dependency of older women?
- Is there a relationship between obesity and functional impairment of older women?

SUBJECT AND METHODS

Research Design

Case control design was used to conduct this study.

Study Setting

The existing study was conducted at Kufur Mosa Amran which was randomly selected from 74 villages of Zagazig district which also was selected from the 21 districts of Sharkia governorate.

Sample

Purposive sample composed of 150 older women.

Fulfilled the following criteria:

- Ages 60 years or more.
- Free from any physical illness that might affect mobility.
- No bedridden
- Willing to participate in the study

Tools for Data Collection

Tool I: It composed of four parts

Part 1: Demographic characteristics of older women as age, marital status, education, job, living with, income, governmental support, crowding index and health insurance

Part 2 Anthropometric measurements (Weight, Height & Body Mass Index) to determine body mass index among older women.

Tool II:

Functional impairment of Older Women Interview Questionnaires. This adopted by Jenkins [9]. It consists of four domains:-

- The first domain used to assess strength of older women.
- The second domain used to assess the upper body mobility of older women.
- The third domain used to assess lower body mobility of older women.
- The Fourth domain was used to assess daily living activities (ADLs).

Scoring System

Each has a number of items with response Yes (cannot do it) and No (can do it). These were scored 1 meaning impaired and 0 meaning not impaired. The scores of the items are summed-up so that a higher score indicates more impairment. A person with a total score of 0 was considered to have no impairment, or otherwise impaired.

Tool III: The instrumental activities of daily living (IADLs) by [10].

Scoring System

The scale examines eight different activities, namely ability to use the phone, shop, prepare food, housekeeping, laundry, use transportation, responsibility for own medication and ability to handle finances. Each of the functions is measured and scored according to the older women actual performance according to the level of ability, which ranges from 3 to 5 categories. For each function, the participant is asked to select the option that most closely resembles her corresponding highest functional level, either 0 or 1. The scores of the eight items are summed-up for a total score that ranges from 0 (low function, dependent) to 8 (high function, independent). A patient with a total score of 7 or higher was considered able to perform the daily life functions effectively, whereas a patient with lower score was considered unable

Operational Design

Content Validity and Reliability

The validity was done by a panel of 3 experts from medical and nursing staff. They reviewed the tools for face and content validation through ascertaining clarity, relevance, comprehensiveness, and understandability. The tools were modified according to their comments and suggestions.

Reliability

Reliability of was done by Cronbach's Alpha tests, it was 0.90 for tool (I) 0.85 for tool (II) and 0.78 for tool (III)

Pilot Study

A pilot study was carried out on 10% of the study subjects (15 older women) and was included. The purpose of pilot study was to test the questions for any ambiguity.

Ethical Considerations

Regarding to the domains of functional impairment (strength, upper body, lower body and activities of daily living ADLs) in the study and control

Concerning the total functional impairment among women in the study and control groups, Table-3 portrays that 98.7% of study group compare to 64.0% in the control group were impaired and unable to function with statistically significance $P < 0.001$.

The ethical issues were taken into consideration during all phases of the study. Firstly, the study was approved by the pertinent authority of research ethics committee (REC) of faculty of nursing at Zagazig University. After explanation of the nature and aim of the study, subjects were given the opportunity to refuse the participation, and they were notified that they could withdraw at any time.

Field work

The researcher visited the village 3days/week (Saturday, Monday and Friday) from 2PM to 4PM. Data collection ran over a period of three months from June 2018 to mid of August 2018.

Administration Design

An official letter containing the aim of the study was issued to faculty of nursing Zagazig University to Omda of kufure Mosa Amran village explaining the nature and aim of this study and seeking facilitating the role of researcher.

Statistical Design

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for quantitative variables.

RESULTS

Regarding demographic characteristics of older women in the study and control groups, Table-1 clarifies that 52.0% of the study groups were married compared to 46.7 % in the control group. As well as, 84.0% of the study group were no educated compared to 89.3% in the control group. Additionally, 90.7% of the study group were housewives compared to 89.3% in the control group furthermore, 92.0% of the study group were living with others (children, family and spouse) compared to 80.0% in the control group with statistically significant difference ($p=0.03$).

group Table-2 demonstrates that there are statistically significant relationship between the study and control group strength($p < 0.001$), upper body($p < 0.001$) and lower body ($p < 0.001$).

Regarding the independence in instrumental activities of daily livings of older women in the study and control group Table-4 shows that 13.5% of the study group had independence in activities of daily living compared to 42.7% in the control group.

Table-6 Shows that age and BMI were risk factors for functional impairment.

Table-1: Demographic characteristics of older women in the study and control groups

	Group				X ² test	p-value
	Obese (n=75)		Control (n=75)			
	No.	%	No.	%		
Age:						
60-	49	65.3	42	56.0		
70+	26	34.7	33	44.0	1.37	0.24
Range	60.0-90.0		60.0-95.0			
Mean±SD	67.3±8.8		69.2±9.3		U=0.71	0.40
Median	65.0		65.0			
Marital status:						
Unmarried (single/divorced/widow)	36	48.0	40	53.3		
Married	39	52.0	35	46.7	0.43	0.51
Educated:						
No	63	84.0	67	89.3		
Yes (basic/intermediate)	12	16.0	8	10.7	0.92	0.34
Job:						
Housewife	68	90.7	67	89.3		
Working	7	9.3	8	10.7	0.07	0.79
Live alone:						
No	69	92.0	60	80.0		
Yes	6	8.0	15	20.0	4.49	0.03*

Table-2: Functional impairment among women in the study and control groups

Functional Impairment(Jenkins)	Group				X ² test	p-value
	Obese (n=75)		Control (n=75)			
	No.	%	No.	%		
Strength:						
Sit 2+ hours	63	84	16	21.3	59.07	<0.001**
Kneel/squat	74	98.6	43	57.3	37.33	<0.001**
Stand after prolonged sitting	66	88	23	30.6	51.09	<0.001**
Pull/push heavy chair	54	72	13	17.3	45.34	<0.001**
Upper body mobility:						
Carry 5+ kg weights	19	25.3	4	5.4	11.55	<0.001**
Pick a coin from the table	14	18.7	3	4.0	8.03	0.005*
Raise arms above shoulders	28	37.3	7	9.3	16.43	<0.001**
Lower body mobility:						
Walk a block with no fatigue	67	89.3	20	26.6	60.45	<0.001**
Walk around a building with no fatigue	48	64.0	9	12.0	43.04	<0.001**
Climb one-floor stairs	71	94.6	64	85.3	3.63	0.057
Basic Activities of Daily Living (BADLs):						
Clothing	14	18.7	3	4.0	8.03	0.005*
Bathing	20	26.7	6	8.0	9.12	0.003*
Feeding	5	6.7	2	2.7	1.35	0.246
Getting off bed	5	6.7	2	2.7	1.35	0.246

Table-3: Total functional impairment among older women in the study and control groups

Total functional impairment domains	Group				X ² test	p-value
	Obese (n=75)		Control (n=75)			
	No.	%	No.	%		
Strength	74	98.6	49	65.3	28.23	<0.001**
Upper body	30	40.0	9	12.0	15.28	<0.001**
Lower body	73	97.3	65	86.6	5.08	0.016*
BADLs	46	61.3	10	13.3	36.93	<0.001**
Total (Jenkins):						
not impaired	1	1.3	27	36.0		
impaired	74	98.7	48	64.0	29.68	<0.001**

Table-4: Lawton instrumental Activities of Daily Living (IADLs) among older women in the study and control groups

	groups				X ² test	p-value
	Group					
	Obese (n=75)		Control (n=75)			
	No.	%	No.	%		
Lawton IADL:						
Using phone	7	9.3	6	8.0	0.08	0.77
Shopping	15	20.0	47	62.7	28.15	<0.001*
Preparing food	19	25.3	46	61.3	19.79	<0.001*
Housekeeping	14	18.7	35	46.7	13.37	<0.001*
Laundry	16	21.3	43	57.3	20.37	<0.001*
Transportation	18	24.0	50	66.7	27.55	<0.001*
Medication uptake	39	52.0	63	84.0	17.65	<0.001*
Finance	43	57.3	68	90.7	21.66	<0.001*
Total Lawton:						
Independent	5	13.5	32	42.7		
Dependent	70	93.3	43	57.3	26.15	<0.001*

Table-5: Best fitting multiple linear regression model for the Lawton score

Items	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	8.07	1.90		4.243	<0.001	4.31	11.83
Age	-0.07	0.02	-0.25	3.872	<0.001	-0.11	-0.04
Married	0.66	0.33	0.12	1.997	0.048	0.01	1.31
Working	2.08	0.53	0.23	3.902	<0.001	1.03	3.14
BMI	-0.10	0.02	-0.39	5.524	<0.001	-0.13	-0.06
Perception of physical fitness score	0.03	0.01	0.25	3.457	0.001	0.01	0.05

Table-6: Best fitting multiple logistic regression model for the total Jenkins (functional impairment)

Items	Wald	Df	P	OR	95.0% CI for OR	
					Upper	Lower
Constant	11.552	1	.001	29751.56		
Age	5.197	1	.023	.93	.87	.99
BMI	12.040	1	.001	.77	.67	.89
Nagelkerke R Square: 0.40						
Hosmer and Lemeshow Test: p=0.114						
Omnibus Tests of Model Coefficients: p<0.001						

DISCUSSION

The current study revealed that there was statistically significant relationship between obesity and functional impairment of older women which all of obese older women except one compared to less than two thirds of the control older women group were impaired which unable to perform their daily functions. This might be due to excessive body fat that can eliminate the elderly women's ability to move freely without pain and quickly added to physiological changes of aging and obesity. Similar to these results two studies the first study was done in Ghana by Boateng *et al.*, [11] who found that 68.67% of the obese group compared to 55.11% of the control group having sever functional impairment. The second study was done by Nayak *et al.*, [12] in the United States.

As regards to Basic Activities of Daily Living domain, The current study revealed that less than two thirds of the obese group compared to less than one fifth of the control group were impaired and unable to

perform the basic activities of daily living with statistically significant relationship between both groups and basic activities of daily living. The current results-was supported by Germain *et al.*, [13] in Michigan found that 59.5% of obese older women had difficulties of activities of daily living, contrasted by Danielewicz *et al.*, [14] in Brazil that found 76% of the obese older women didn't have functional impairment.

Concerning the lower body mobility, the findings of these results confirmed that there was significant statistically association between both groups and lower body mobility. This findings are consistent with that of Rolland *et al.*, [15] in America who found that 41.3% of obese older women had difficulty in climbing stairs, 34.1% of them had moving difficulties.

Concerning the strength of older women, the results of the current study revealed that the majority of the obese group compared to about two third of the

control group were impaired. In the same line of the current study, Gomes-Neto *et al.*, [16] in Brazil reported that 62.5% of the obese older women compared to 36.5% of the control group have difficulty in rising after sitting on chair.

Regarding the upper body mobility, the current study revealed that two fifths of the study group compared to minority of the control group were-impaired with statistically significant association between both groups and upper body mobility. In the same line a study was carried by Jindai *et al.*, [17] in the United States found that 19% of the obese older women had difficulty in picking up small objects and 30% of the obese older women had difficulty in lifting heavy object.

As to Dependence of older women in instrumental activities of daily living, it is obvious that majority of the studied obese older women were dependent compared to more than two fifths of the control group. In the same vein, the result was reported by Shankar and Balamurugan *et al.*, [18] in India found that majority of the obese older women at rural area were dependent in instrumental activities of daily living.

Regarding the multiple logistic regression model for the total impairment (Jenkins), the current study revealed that increasing BMI and age were considered risk factor for development of functional impairment. This might be due to as mentioned previously excessive fat tissues increase burden on joints plus physiological changes of aging of older women. In the same blood stream, Vásquez *et al.*, [19] in United States that found overweight and obesity was associated with higher levels of functional limitations when compared to normal weight individuals regardless of physical activity status with (OR) 2.71 (2.00–3.67) even after adjustment for confounders

RECOMMENDATIONS AND CONCLUSION

The current study-provide further evidence for the relationship between the obesity and functional impairment of older women at rural areas. Majority of older women were housewives. Majority of obese older women compared to less than two thirds of the control group have functional impairment. So, functional ability assessment should be performed in the primary care health services as a routine, health education campaigns appear to be the most effective interventions to increase awareness of older women concerning obesity related health risks and rural areas should be enriched with affordable elderly care services to address elderly obesity and to alleviate risks of functional impairment.

REFERENCES

1. Pini, S. E. (2014). The elderly health status correlation with aging biomarkers: the european project mark- age, *www.sciencedirect.com*.
2. Sweed, H. S. (2016). Population aging-Egypt report, *Middel East journal of age and aging*, 13(2):10-14.
3. Ryan, A. S. (2010). Exercise in aging: its important role in mortality, obesity and insulin resistance. *Aging health*, 6(5), 551-563.
4. O'Shea, J. J., & Plenge, R. (2012). JAK and STAT signaling molecules in immunoregulation and immune-mediated disease. *Immunity*, 36(4), 542-550.
5. Bell, J. A., Sabia, S., Singh-Manoux, A., Hamer, M., & Kivimäki, M. (2017). Healthy obesity and risk of accelerated functional decline and disability. *International Journal of Obesity*, 41(6), 866-872.
6. Gratao, A. C. M., Talmelli, L. F. D. S., Figueiredo, L. C., Rosset, I., Freitas, C. P., & Rodrigues, R. A. P. (2013). Functional dependency of older individuals and caregiver burden. *Revista da Escola de Enfermagem da USP*, 47(1), 137-144.
7. Abdulaziz, K. E., Brehaut, J., Taljaard, M., Émond, M., Sirois, M. J., Lee, J. S., ... & Perry, J. J. (2016). National survey of family physicians to define functional decline in elderly patients with minor trauma. *BMC family practice*, 17(1), 117.
8. Kurspahić-Mujčić, A., & Zečo, E. (2017). Socioeconomic and demographic factors associated with abdominal obesity in women of childbearing age. *Medicinski glasnik: official publication of the Medical Association of Zenica-Doboj Canton, Bosnia and Herzegovina*, 14(2), 218-223.
9. Jenkins, K. R. (2004). Obesity's effects on the onset of functional impairment among older adults. *The Gerontologist*, 44(2), 206-216.
10. Lawton, M. P., & Brody, E. M. (1969). Assessment of older people: self-maintaining and instrumental activities of daily living. *The gerontologist*, 9(3_Part_1), 179-186.
11. Boateng, G. O., Adams, E. A., Boateng, M. O., Luginaah, I. N., & Taabazuing, M. M. (2017). Obesity and the burden of health risks among the elderly in Ghana: A population study. *PloS one*, 12(11), e0186947.
12. Nayak, P., Vernon, S. W., Savas, L. S., Basen-Engquist, K., Morgan, R. O., & Elting, L. S. (2016). Functional impairment and physical activity adherence among gynecologic cancer survivors: a population-based study. *International Journal of Gynecologic Cancer*, 26(2), 381-388.
13. Germain, C. M., Batsis, J. A., Vasquez, E., & McQuoid, D. R. (2016). Muscle strength, physical activity, and functional limitations in older adults with central obesity. *Journal of aging research*, 2016.
14. Danielewicz, A. L., Barbosa, A. R., & Del Duca, G. F. (2014). Nutritional status, physical performance and functional capacity in an elderly

- population in southern Brazil. *Revista da Associação Médica Brasileira*, 60(3), 242-248.
15. Rolland, Y., Lauwers-Cances, V., Cristini, C., van Kan, G. A., Janssen, I., Morley, J. E., & Vellas, B. (2009). Difficulties with physical function associated with obesity, sarcopenia, and sarcopenic-obesity in community-dwelling elderly women: the EPIDOS (EPIDemiologie de l'OSteoporose) Study. *The American journal of clinical nutrition*, 89(6), 1895-1900.
 16. Gomes-Neto, M., Araujo, A. D., Junqueira, I. D. A., Oliveira, D., Brasileiro, A., & Arcanjo, F. L. (2016). Comparative study of functional capacity and quality of life among obese and non-obese elderly people with knee osteoarthritis. *Revista brasileira de reumatologia*, 56(2), 126-130.
 17. Jindai, K., Nielson, C. M., Vorderstrasse, B. A., & Quiñones, A. R. (2016). Peer Reviewed: Multimorbidity and Functional Limitations Among Adults 65 or Older, NHANES 2005–2012. *Preventing chronic disease*, 13.
 18. Shankara, R., & Balamurugana, S. S. (2011). Prevalence of Chronic Energy Deficiency, Overweight and Obesity among the Geriatric Population in a Rural Area in Tamilnadu. *Sri Ramachandra Journal of Medicine*, 4(1), 24.
 19. Vásquez, E., Batsis, J. A., Germain, C. M., & Shaw, B. A. (2014). Impact of obesity and physical activity on functional outcomes in the elderly: data from NHANES 2005-2010. *Journal of aging and health*, 26(6), 1032-1046.